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PROVIDING CUSTOMER FINANCING THROUGH UTILITY ENERGY EFFICIENCY PROGRAM

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EXECUTIVE SUMMARY

As the electric utility industry restructures, we find ourselves living in interesting times. Business is not "as usual" and no one is quite sure what the future holds. In terms of energy efficiency, we see a departure from traditional demand-side management (DSM), with utilities wanting to cut costs but retain customers. Utilities are testing new approaches to providing energy efficiency services to customers. Although past experience with DSM financing has not proven to be an out-and-out success, utilities are experimenting with variations on this old theme to see if financing can work in this new environment.

In this more competitive environment, new opportunities arise that support the evolution of financing mechanisms as part of utility energy efficiency programs. More than ever, utilities want to cut costs, and, if designed well, financing mechanisms will allow utilities to shift the bulk of energy efficiency programs' costs to participating customers. If administrative and marketing costs are not excessive, financing options have the potential to minimize both rate-impact and cross-subsidization issues (ratepayers subsidizing energy efficiency programs that they don't receive).

Although there are many factors working in support of financing programs, their success requires overcoming many obstacles. Most utilities lack expertise in providing consumer financing, thus making it more costly. High participation rates may be difficult to achieve on a wide-spread basis, thus limiting energy savings. In addition, in some cases customers have become accustomed to rebates and may not be interested in financing. Certainly, financing mechanisms represent just one piece of a package of programs designed to achieve energy efficiency goals. Time will tell whether utilities can design energy efficiency programs that offer customers financing options that achieve participation and savings levels comparable to successful rebate programs at significantly lower utility costs.

This report discusses different approaches that utilities are taking to provide customers with financing for energy efficiency improvements, including various types of financing mechanisms, such as loans, shared savings, leases, energy service charges, and end-use pricing. The report also discusses synergistic partnerships that utilities are developing to facilitate the financial portion of

energy efficiency programs. Case studies of energy efficiency programs with financing components are profiled to show the lessons that can be learned from them. The case studies represent a variety of types of financing mechanisms, target a variety of customer sectors, and have a variety of funding sources. Finally, recommendations for designing successful programs are offered.

INTRODUCTION

For the past two decades, electric utilities have encouraged customers to save energy through demand-side management (DSM) programs that offered rebates, energy audits, and/or sometimes free energy-efficient measures and services. With the restructuring of the electric utility industry, however, electric utilities are changing the way they do business in order to become more competitive. Utilities are trying to minimize costs and rates, and focusing more on customer service. It is still unclear as to how energy efficiency goals will be achieved in the future. It's hoped that systems benefit charges (a small system-wide wires charge) will provide the funding needed to continue making progress in energy efficiency. Utilities are shifting toward less cost-intensive DSM programs, including shifting costs to participating customers (Schweitzer and Pye 1995). This report focuses on utility energy efficiency programs that contain a financing component. Offering a financing mechanism in utility energy efficiency programs is one way to attempt to meet three goals: the utility's goal of lowering costs, the customer's goal of lowering bills, and society's goal of reducing air pollutants.

For more than a decade, utilities have experimented with financing mechanisms, such as loans and shared savings, in their DSM programs. These programs have usually had lower participation rates than other program approaches and have had difficulty achieving large, cost-effective energy savings. However, new approaches for offering loans and shared savings continue to be developed and deserve attention, especially in light of the competitive direction in which the electric utility industry is heading (Nadel 1996a). Financing mechanisms allow utilities to provide a valued customer service while leveraging utility investment with the intent of minimizing rate impact. Providing financing instead of rebates shifts the majority of the costs to the customer. In return, customers receive a service that they value without having to use their own money for the significant initial investment. Customer focus groups have indicated that most customers believe that energy efficiency is very important, but lack the money, time, and/or knowledge to complete retrofits of their homes or businesses (Berkowitz, Karl, and Edgar 1996).

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TYPES OF FINANCING MECHANISMS

Loans

With a utility energy efficiency loan, the utility generally lends money to participants to pay for the initial investment in energy efficiency measures. The loan eliminates the barrier of the initial investment, which sometimes prevents customers from pursuing energy efficiency projects. The utility may be able to lend money at lower rates than many customers can get themselves if utilities have a lower cost of capital. However, the relative capital cost advantage of utilities is diminishing quickly as a result of utilities becoming competitive. Regulated wires companies may have access to low-cost capital in the future as a result of securing a long-run stable income source. Generating companies, however, are losing access to low-cost capital as their risk levels heighten with additional competition (Gordon 1996). Some utilities claim a 15 percent opportunity cost of capital, indicating that they can get or would want a 15 percent return on their capital (Prindle 1996).

Utilities may charge the customer an interest rate slightly higher than its cost of capital to cover administrative and servicing costs and bad debt, or they may subsidize the rate to make their program more attractive. If utilities do not have expertise with lending money and do not have the infrastructure to service loans, their inexperience could drive up these costs. If a utility cannot service loans cost effectively or does not have access to low-cost capital, it may make sense for

the utility to partner with a business that does not face these obstacles. Some utilities have chosen to use *third-party financing*, which is discussed in the "Partnerships" section of the report.

Several case studies profiled in this report involve either utility-funded or third-party loans, including PG&E's Home Energy Savings Loan, Sacramento Municipal Utility District's (SMUD) Conservation Power Financing, Virginia Power's Financing for Energy Efficiency, Connecticut Light & Power's Hospital Revolving Loan, and PG&E's Capital Advantage.

Energy Service Charges

Energy service charges (ESCs) are a method of servicing a loan. The utility lends participants money to pay for the initial energy efficiency investment, but rather than structuring the repayment as a separate loan agreement, customers can repay the loan through an energy service charge on their monthly utility bill for a specified period of time. This charge can be either a fixed amount or vary according to the amount of energy saved. Either way, the amount is typically estimated to be less than or equal to the value of the energy savings, giving customers a positive or neutral cash flow. Being able to repay loans or leases on a monthly utility bill simplifies the process for the customer and decreases loan losses for the utility (Meal, Monsen, and Selting 1996).

The repayment of loans on a monthly bill, however, may be problematic for a utility from an administrative standpoint. A utility's computerized billing system may not be flexible enough to accommodate an additional field or line item. In addition, the utility may have difficulties reconciling the bill. For example, if a customer's bill contains an ESC in addition to regular charges, and a customer sends in a partial payment, how is the payment applied to the different charges on the bill? Problems such as this require additional software (and additional expense) to reconcile accounts. Another potential problem with ESCs from the utility's standpoint can arise with trying to create a positive cash flow for customers with smaller loans. Achieving a positive cash flow may require reducing the monthly payment to an inordinately small amount by lengthening the repayment period, which increases the utility's administrative costs and risk (Berkowitz 1996).

Several Wisconsin utilities have been successful with the ESC approach for financing energy efficiency for residential customers. ESCs are particularly attractive to commercial and industrial customers because this approach allows them to finance energy efficiency upgrades "off balance sheet" (i.e., the ESC is not treated as a liability). In the case of real estate developers, an ESC allows them to pass the costs on to tenants (Meal, Monsen, and Selting 1996). PacifiCorp was a forerunner with its ESC program, Energy FinAnswer, which has been very successful with commercial new construction.

Leases

Another form of financing energy-efficient equipment is through leases, or rental agreements, in which a utility or third party provides all of the initial capital required and the participating customer makes lease payments. At the end of the lease period, the participant may have the option to buy the equipment, depending on the stipulations of the lease (either for a nominal amount, market value, or a specified residual amount). As with loans and ESCs, lease payments are generally less than the energy savings, giving the participant a positive cash flow (Higgins 1996; Prindle 1996). As with ESCs, creating a positive cash flow for smaller leases may require reducing the monthly payment to an inordinately small amount by lengthening the repayment period, which increases the utility's administrative costs and risk (Berkowitz 1996).

Leasing has been especially popular in compact fluorescent lighting (CFL) programs, such as Burlington Electric Department's Smartlight Program, but has also been used to promote heat pumps (Virginia Power's Financing for Energy Efficiency Measures) in an effort to overcome the issue of a high initial investment.

Shared Savings

In a shared savings approach, a utility or energy service company (ESCo) helps identify and finance energy efficiency measures in customer facilities. As energy savings accrue, the customer then pays the utility or energy service company a portion of the money saved. In some programs, all program costs are recouped from participating customers; in other programs, only a portion

of program costs are recouped—remaining costs are a utility-financed investment in end-use efficiency. While the shared savings concept appears very attractive on paper, and these programs can be effective for some market niches such as government buildings, for the most part they have not been very successful (Nadel 1996b). Their lack of success has resulted from their need for monitoring and evaluation of each site to determine the amount of savings to be shared. This is a costly process with risk involved (Prindle 1996).

End-Use Pricing

A very old concept that is being considered again is Thomas Edison's idea that utilities should sell energy services, not kWh (see, for example, LeBlanc 1994). Under this concept, which is sometimes called end-use pricing, utilities own or lease energy-using equipment, such as lights and motors, and charge customers for the energy services delivered, such as lumen-hours of lighting or Btu's of heating or cooling. With utilities responsible for the equipment and being paid for services, not kWh, utilities have an incentive to invest in efficiency improvements that provide the same or more energy services for less kWh. However, many issues need to be addressed before this system can be used successfully, such as dealing with ownership issues (most customers presently own their own equipment), performance specification and monitoring, pricing and other contract terms, and equipment maintenance (Nadel 1996a). Wisconsin Electric's End-Use Pricing Program is discussed later in the report.

PARTNERSHIPS

Since utilities are not usually experts in the field of financing, many have created partnerships with businesses that are better able to manage the risk involved with lending money and service the accounts. Discussion of several of the more common types of partnerships follow.

Third-Party Financing

Third-party financing involves turning over the financing portion of an energy efficiency program to a financial institution or another company, such as an energy service company (ESCo), more experienced in managing financial risk and servicing loans. Third parties can play various roles:

- providing capital only—utility does marketing, underwriting, servicing of loans, and collection of payments;
- providing capital plus some combination of marketing, underwriting, servicing, and collection functions; and
- turnkey—third party performs all of the above functions, with the utility mainly providing referrals (Prindle 1996).

The utility/third party partnership can be synergistic in that the third party profits from the utility's energy efficiency expertise, ability to estimate bill savings, customer-base access, and incentives (e.g., a loan rate buy down). The utility can benefit from the third party's experience in evaluating and managing risk and administering the loan process. If a utility lacks financing expertise, utilizing a third party to facilitate financing can lower the total cost and avoid the need to create a banking infrastructure at the utility (Higgins 1996). Using third-party capital is also attractive to a utility because it can remove the liability from the utility's balance sheet, thus decreasing its risk and potentially increasing its bond rating (Berkowitz 1996). Certainly, a major consideration when a utility is deciding whether or not to utilize third-party financing is whether or not the third party can offer lower interest rates than the utility.

The advantages and disadvantages of using third-party financing will be different for each utility. In general, however, the utility wants to pursue the scenario that:

- allows the utility to maximize potential participation by minimizing interest rates;
- minimizes administrative costs; and
- minimizes the utility's risk.

Several of the programs profiled in the Case Studies section utilize third-party financing. For example, Volt VIEWtech, a company that has provided program management and services to electric, gas, and water utilities for many years, administers the financing of PG&E's Home Energy Savings Loan program. Public Service Electric & Gas (PSE&G) facilitates small-customer projects by offering participants in their Standard Offer program the opportunity to choose either the utility's own Energy Service Business or a third-party ESCo to provide financing and sponsorship. Aspen Systems Corporation (not profiled here) markets its Financing Choice Program to utilities as a tool in the new competitive marketplace. The program offers a range of financing options—from loans to energy savings performance contracts—to appeal to a range of consumer needs, and handles the entire process from financing application and servicing to measure implementation. The intent is to simplify the process for both the customer and the utility (ASC 1996).

Selling Loan Pools to a Secondary Market

Another option to help utilities offer financing to customers for energy efficiency upgrades is selling loan pools to a secondary market. Utilities or a financial partner originate and service loans, bundle them, and transfer loan obligations to a secondary market. This mechanism allows customers with smaller loans (e.g., residential customers) to gain access to lower-cost funds that are generally available only to large, established customers. Using a secondary market also frees up lender (utility) capital and reduces lender risk of default.

One example of a secondary lender is Fannie Mae (Federal National Mortgage Association), which has developed a financial vehicle to facilitate residential financing of energy efficiency. Fannie Mae, a privately owned corporation, loans money in the residential sector at lower interest rates than otherwise available to consumers. Fannie Mae is able to lend at lower rates because of its high volume and efficiency of lending and its excellent credit rating. With approximately ten percent of the nation's 65 million households doing something to his or her house each year (e.g., furnace replacement, new roof, insulated attic), Fannie Mae, with an outstanding loan portfolio approximately 1,000 times larger than all U.S. residential DSM spending in 1993, sees an opportunity to lend substantial amounts of low-interest capital for efficiency improvements at the

time of remodeling and equipment replacement (e.g., heating, ventilation, and air conditioning). Utility programs can give consumers access to this funding source. PG&E's Home Energy Savings Loan program was the first utility program to utilize Fannie Mae's residential retrofit initiative (IRT 1996b).

Energy Services Businesses

A different form of partnership is the growing trend of utilities creating for-profit subsidiaries—Energy Service Businesses (ESBs)—that sell energy services to customers on a for-fee basis. This market-based approach appeals to those customers who value energy efficiency services enough to pay for them. Successful DSM programs have made it possible for energy efficiency services to become marketable by proving their cost effectiveness. Non-regulated ESBs allow for an increased amount of program flexibility, including flexibility in offering more financing options to customers. Working with ESBs seems to be most popular with larger customers, as seen in some of the profiled programs that are run by ESBs. Southern California Edison's ENvest has attracted mostly institutional customers and Virginia Power's EVANTAGE works with large commercial and industrial customers. Public Service Electric & Gas created a subsidiary primarily to provide investment capital and sponsorship for their Standard Offer participants.

Trade Allies

Trade allies can also be potential financial partners. Energy-efficient equipment manufacturers, vendors, and contractors have sales-motivated reasons to facilitate customer purchases of energy-efficient equipment and services. If they also have access to low-cost capital, these circumstances may promote a partnership with utilities that have complementary expertise (Higgins 1996). This type of partnership can be especially useful in targeting equipment replacement opportunities as most customers first contact vendors when they need new equipment. Because equipment replacement is often unplanned, customers may not be in a good position to finance large capital investments and would therefore be more inclined to seek alternate financing paths, such as a vendor or utility (Prindle 1995).

BACKGROUND

For more than ten years, utilities have experimented with financing mechanisms in DSM programs. These programs have usually had lower participation rates than other program approaches and have had difficulty achieving large, cost-effective energy savings. However, new approaches for offering financing continue to be developed and deserve attention, especially in light of the competitive direction in which the electric utility industry is heading (Nadel 1996a).

Utility-operated DSM programs that offered loans were popular in the early 1980s, particularly for residential customers. Perhaps the most successful of these loan programs was the Tennessee Valley Authority's (TVA) Home Weatherization program. This program provided zero-interest loans to households for weatherization improvements. Over the ten-year period in which it operated (1978–1988), over 600,000 homes participated, representing 23 percent of eligible households. Reasons for this high participation included an attractive interest rate, the availability of free energy audits, and extensive advertising during a period of high consumer interest in energy issues. Both interest rates and energy prices had been rising steeply during this period. The TVA program had a utility cost of approximately $0.01 per kWh saved and a total resource cost of approximately $0.03 per kWh (both figures are based on engineering estimates) (Nadel, Pye, and Jordan 1994).

In the mid- and late-1980s some utilities started offering rebates, including several programs that offered both loans and rebates. These utilities found that most customers preferred rebates. For example, both Wisconsin Electric and Puget Sound Power and Light offered commercial and industrial (C&I) customers a choice between a zero interest loan or a rebate that was approximately equivalent to the interest subsidy on the loan. In both programs, over 90 percent of the participating customers chose rebates instead of loans, although loans were useful for the minority of customers who lacked capital to finance measures on their own. Also, these utilities found that the rebates were generally easier to administer than loans (Nadel 1990). Comparisons of residential loans versus grants have reached similar conclusions (Stern, Berry, and Hirst 1985). As a result of these findings, most utilities discontinued their loan programs in favor of rebates (Nadel 1996a).

In the late 1980s, several utilities, including Central Maine Power (CMP), Northeast Utilities (NU), and Wisconsin Power & Light (WP&L), offered industrial shared savings programs. Most of these programs included some utility subsidies. Participation rates were disappointingly low: for example, 1 out of 45 targeted customers participated in CMP's program while only 3 out of 179 participated in NU's program. These programs were generally marked by complex negotiations on how savings would be measured and the energy service provider paid. Many of these discussions never reached completion (Nadel 1996a).

In the 1990s, in an attempt to lower the utility share of energy efficiency costs and to use non-utility capital to help finance efficiency improvements, some utilities started experimenting with loans and shared savings again and a few utilities also experimented with leases. Several of these programs have achieved good participation rates although program operators generally note that it is much more difficult to market a loan program than a rebate program (Nadel 1996a).

Recently, customer focus groups have indicated that most customers believe that energy efficiency is very important, but lack the money, time, and/or knowledge to complete retrofits of their homes or businesses. In a Midwestern focus group, customers responded positively to the idea of energy specialists assessing efficiency upgrades, with residential customers willing to pay $30-$50 for this service and businesses willing to pay $50-$100. Most customers indicated that they prefer receiving initial information from an objective third party. Customers also liked the idea of contractor arranging (help with screening contractors), financing (interest rates < 10 percent, positive cash flow financing plans, or repaying loans on utility bill), and quality control of contractor work (Berkowitz, Karl, and Edgar 1996).

In a 1995 survey (37 utilities and 22 state regulatory commissions) conducted by Oak Ridge National Laboratory and ACEEE, both utilities and state regulatory commissions indicated that they expect their energy efficiency programs to change over the next few years in ways designed to make them more cost effective and service oriented. Specifically, utilities and commissions said they would put less emphasis on rebates and direct installation of DSM measures and more emphasis on a variety of other approaches, including: recovering program costs from participants,

providing financing, shared savings programs, leasing equipment, and market transformation (Schweitzer and Pye 1995).

In an effort to build upon these past research findings and better understand the current generation of financing tools and the lessons they teach, case studies on 12 current energy efficiency programs that have financing components are provided. The case studies are categorized as either residential or commercial, industrial, and institutional, according to the primary focus of the program. Some programs are available to all customers, regardless of customer class. These particular case studies were chosen because they offer a variety of lessons to be learned regarding providing a financing component to customers in utility energy efficiency programs.

CASE STUDIES: RESIDENTIAL SECTOR

Pacific Gas & Electric's Home Energy Savings Loan

Pacific Gas & Electric (PG&E) was the first utility to utilize Fannie Mae's residential retrofit initiative. Their program provides loans to residential customers who buy efficient air conditioners, insulation, and low-emissions windows from approved contractors. PG&E began its Home Energy Savings Loan program in October 1994, initially in cooperation with a local bank, which originated and serviced the loans. In July 1995, PG&E contracted Volt VIEWtech as its primary lender in an effort to stimulate loan volume, lower interest rates, and better align the program's financial and energy aspects. Volt VIEWtech is a utility service company with experience in implementing utility energy efficiency programs. The program provides unsecured loans of $1,000 to $15,000 at below-market, tiered interest rates. The below market rates are possible due to the low cost of capital from Fannie Mae. Interest rates are tiered to encourage more comprehensive retrofits and to cover the higher relative cost of processing smaller loans. Rates range from around 8.4 percent for the largest loans to 12.9 percent for smaller loans (IRT 1996b).

Volt VIEWtech receives loan applications, performs credit checks, underwrites and originates loans, and packages groups of loans together to sell to Fannie Mae. The loan approval process is based on the customer's utility bill payment history and credit score from an external credit rating agency. Because the credit check does not take into account a customer's income level, employment history, or debt-to-equity ratio, loan approvals are faster and greater in number (70-80 percent approval rate). The speed of the credit checks is very appealing to customers who, for example, may want to replace an air conditioner during a heat wave (IRT 1996b). Participants repay the loan directly to Volt VIEWtech, which issues a repayment coupon book to participants. PG&E prefers that the loan repayment not appear on the utility bill, so the customer associates PG&E with the services it offers, not with the money they've borrowed to pay for the services (Jacobson 1996).

As of October 1996, over 8,000 loans had been approved, the majority of which (~80 percent) are for central air conditioning replacement. Although this is less than a 1 percent participation rate based on the number of residential customers, it represents approximately 20 percent of estimated annual air conditioner sales. These loans are valued at more than $57 million, with an average loan size of $6,500 (Thomas 1996). The participation in this program has been picking up, with about half the loans occurring in the second and third quarters of 1996.

PG&E spent about $1.2 million on administrative and advertising costs in 1995, and is estimating a $1 million expense in 1996. PG&E guarantees loans but has not incurred any costs for bad debt because Fannie Mae is liable for the first 1.5 percent of defaulted loans, and the default rate is currently running around 1 percent. The program will achieve in 1996 energy savings of approximately 2,900 MWh and 24,400 therms, based on engineering estimates (Jacobson 1996). Based on these costs and savings, a 12-year measure life, and a 5 percent real discount rate, the utility's levelized cost of saved energy is approximately $0.035 per kWh saved over the life of the measures (ACEEE calculation). For perspective, the levelized cost for PG&E's 1992 Air Conditioner Rebate program, which had similar participation as the loan program, was $0.11 per kWh saved (Nadel, Pye, and Jordan 1994). The program is pushing the air conditioning market to become more efficient by requiring higher minimum SEER (seasonal energy efficiency rating) values (11-12) than the current market average (10-11) (Jacobson 1996).

Qualified contractors are also credited as an important factor in achieving energy savings in a loan program. To be approved, contractors must be certified by the Electric and Gas Industries Association, and are required to attend one-day classes on quality installation procedures. Contractors pay for these courses and for more in-depth training offered by PG&E, thus defraying utility program costs. In addition, a large sample of projects receive quality-control inspections from PG&E. The program now focuses on reducing peak cooling loads, but the utility expects that additional measures, including gas reduction measures, will become eligible for financing in the near future (Byrne 1996).

The utility is using bill inserts and newsletters to market the program. In addition, PG&E operates the "Smarter Energy Line," a toll-free hotline that provides customers with loan program information and application forms. Contractors are also marketing the program, using brochures provided by PG&E (IRT 1996b). PG&E is fine-tuning the program now to make it as competitive as possible in terms of rates and services. The program manager believes that a key asset of the program is its ability to give customers unbiased information about energy-efficient equipment (Jacobson 1996).

Bay State Gas runs a program similar to PG&E's, offering loans to residential customers for energy efficiency improvements and high-efficiency appliances. Loans are offered through their subsidiary, Bay State Energy Products and Services, in cooperation with Fannie Mae (ASE 1996).

Virginia Power's Financing for Energy Efficiency Measures

Virginia Power offers financing of energy efficiency measures that save at least 15 percent of total annual energy consumption. This program grew out of Virginia Power's Comfort Assured Heat Pump Dealer Program, which was having problems with the issue of high first cost. As a result of this evolution, the preponderance (95 percent) of loans approved are for heat pumps. What makes this program especially interesting is that interest rates are based on the efficiency of the heat pump, with lower rates for more efficient equipment. Interest rates range from below prime at 6 percent with heat pumps with a SEER rating of 15+ to 11.45 percent for SEER 10, the minimum efficiency allowed. All other energy efficiency upgrades can be financed at 13.45

is now being given to improving the quality of the loan portfolio, and an outside collection service is used to help with delinquencies. In the past year and a half, SMUD has instituted stricter credit underwriting criteria, and has recently implemented a new billing system (McCann 1996). SMUD is consolidating its underwriting and collections departments and adopting a new information management services system in an attempt to streamline and facilitate its lending operation (ESTR 1996).

On a pilot basis, SMUD experimented with using a commercial bank as an alternative funding source. However, the utility prefers to self-fund loans because it feels third-party financiers take the utility "out of the loop," weakening the utility's relationships with customers (McCann 1996).

Because the loans are offered as a service in all SMUD DSM programs, it is difficult to isolate energy or capacity savings or its cost-effectiveness on a kWh-saved basis.

Wisconsin Public Power SYSTEM's and Wisconsin Gas Company's New London Resource Project

The New London Project, which began in April 1993, takes a whole-building approach when assessing cost-effective electric-, gas-, and water-efficiency measures for their residential and commercial customers. For residential customers, an audit costs $35 and includes a walk-through assessment of potential efficiency upgrades, analysis of potential savings from installing insulation and programmable thermostats, a blower-door diagnostic test, installation of low-cost hot water saving devices, and a demonstration of CFLs in the customer's home. CFLs, programmable thermostats, and additional showerheads and aerators are sold to customers at a 20-30 percent mark-up, which helps defray program costs. The audit determined that it was not cost effective to install additional measures beyond the low-cost devices installed during the assessment (Berkowitz and Karl 1996; Berkowitz, Karl, and Edgar 1996).

Financing for measure installation, which is ratepayer funded, is available at a 6 percent interest rate, requires no down payment or minimum loan amount, and can be repaid on the customer's utility bill in the form of an energy service charge. In most cases, financing packages are designed to have immediate positive cashflow, meaning monthly energy savings are greater than monthly

loan payments, which may stretch over as many as seven years (Berkowitz and Karl 1996; Berkowitz, Karl, and Edgar 1996).

The project is community based, using local marketing, equipment distributors, and contractors. Experience has shown that some of the most successful energy efficiency programs (in terms of participation rates) have used a cohesive community network to market a program (Gordon et al. 1996). The New London Project helps customers with contractor arranging and bid solicitation. Local trade allies install efficiency measures and help promote the program, and quality control checks are performed on installed measures (Berkowitz, Karl, and Edgar 1996).

The program provided assessments for 27 percent (555) of New London single-family homeowners. Forty-one percent of participants purchased an average of five CFLs per household. Sixty-five percent of the households financed their energy assessment, totaling $137,500 in residential customer financing. The balance of customers chose to pay for the assessment up-front and receive a $5 "prompt-payment discount." Of those receiving assessments, 13 percent were deemed good candidates (in terms of cost effectiveness) for sidewall insulation and 32-33 percent for attic insulation and air sealing. More than 40 percent of homes with insulation potential installed the recommended measure(s). Only 4 percent of the homes having air sealing potential hired a contractor to perform the work, with most homeowners believing they could complete the air sealing themselves. In the first year, residential customers saved almost 500 MWh and 42,000 therms (Berkowitz, Karl, and Edgar 1996).

The New London Project also provided free assessments to 150 commercial and industrial (C&I) customers (54 percent participation) and eight industrial customers (44 percent participation). Almost half of the commercial participants had high-efficiency lighting installed and water heating and conservation measures were often installed. Some high-efficiency motors were installed in industrial sites. To date, C&I participants account for $582,000 of the financing, and almost 3,000 MWh in electricity savings and more than 400,000 therms of natural gas savings—approximately 8.5 times the energy savings from the residential sector. Water savings for all sectors amounts to almost 3.7 million gallons (Berkowitz, Karl, and Edgar 1996).

A rough estimate of the utility cost per lifetime kWh is $0.005-0.01 per kWh (unlevelized), and the total resource cost (TRC) has been estimated to range from $0.015-0.03 per kWh saved, which is consistent with most lighting retrofit programs (Gordon et al. 1996). Assuming a 15-year average measure life and a 5 percent real discount rate, these unlevelized costs become $0.007-0.015 to the utility and $0.020-0.045 TRC (ACEEE calculation). As of the end of 1996, the project has no defaulted loans, with bill payment history as its only qualifying criterion (Berkowitz 1996).

Northern States Power (NSP) began its Energy Smart Project in March 1995 in Park Falls, Wisconsin. The program is very similar to the New London program, but used the experience of the New London program to make some improvements. For example, because initial audits indicated that additional measures (beyond those low-cost measures installed during the assessment) were not cost effective for many customers in New London, Energy Smart now offers two types of assessment (minor and complete), based on customer needs determined during a screening that is performed during scheduling. The loan interest rate is 7 percent with a minimum monthly payment of $5 to avoid exceptionally small monthly payments that would have unacceptably high transaction costs for the utility. Results from the program are not yet available.

Both of these community energy efficiency programs were designed by the Wisconsin Energy Conservation Corp. (WECC). WECC plans to continue to build on the experiences of these two programs by incorporating lessons learned into future programs. Its next program is Efficiency Plus, to be piloted in Marshfield and Hewitt, Wisconsin. Efficiency Plus will attempt to determine the extent to which customers and trade allies are willing to pay for utility services such as marketing, financing, customer referral, training, etc. WECC also plans to look at third-party financing, an unsubsidized catalog of efficiency products that can be distributed widely, non-energy services, a menu of services offered to customers on an *a la cart* basis, and customized services for industrial customers (Berkowitz, Karl, and Edgar 1996).

Burlington Electric Department's Smartlight Program

Burlington Electric Department's (BED's) Smartlight Program, which started in late 1989, has achieved a cumulative participation rate of more than 45 percent (as of 12/31/95) by leasing CFLs to residential customers. Lease payments of $0.20 per month per bulb are included on the customer's utility bill for 60 months. This payment is structured so that monthly energy savings exceed the lease cost if the lamp is used more than 1.5 hours per day. Lease payments cover the costs of bulbs but not program administrative costs, which are paid by BED. A customer is given a two-month free trial period to decide whether he or she wants to keep and pay for the bulbs and may return the bulb for any reason at any time and stop the lease. These features are important promotional tools (IRT 1994b; Richards 1996).

The Burlington program offers about 16 different lighting products, and is promoted via a customer newsletter, media advertisements, and telemarketing. Customers can pick up bulbs at the utility office or they can schedule a home visit conducted by trained BED staff. The utility's in-house customer service and cashier personnel have received extensive training to better serve customers. Because Burlington is a small community (only 15,000 eligible households), it has been possible to reach most of the community in this manner. In the past, Smartlight and Neighbor$ave, a direct-install, door-to-door program, have joined forces to market the CFL leasing program. Today, two-thirds of the business has shifted back from the Neighbor$ave program to over-the-counter leases (IRT 1994b; Richards 1996).

Through 1995, Smartlight's 6,700 residential participants were saving a total of 4,800 MWh annually (per impact evaluation) (Richards 1996). ACEEE estimates the levelized utility cost of this program at $0.03 per kWh (Nadel, Pye, and Jordan 1994).

Electricite' de France (EDF) ran a similar, successful CFL leasing program in Guadeloupe and Martinique in 1992. The program was implemented jointly with ADEME (Agency de l'Environnement et de la Maitrise de l'Energie), the French Environment and Energy Management Agency. The program began with an extensive awareness-building campaign, using television, radio, and print. EDF sent every customer a coupon for ten CFLs at no initial cost. As in

Burlington's program, lease payments were designed to be less than or equal to energy-bill savings, creating a revenue-neutral or positive cash flow situation for participants (IRT 1994c). The goal of the program was to lower the evening peak demand by reducing lighting demand on these Caribbean islands. Thirty-four percent of all households participated in the program, with an average of 7.8 CFLs per household. The program was successful in reducing peak demand by seven MW, or 5-6 percent, on each island. In addition, each island realized annual energy savings of 29-33 GWh and cut participants' electricity bills. The utility will realize more than $18 million in cost savings from this project because it costs the utility twice as much to deliver energy to these islands as it is legally allowed to charge for the electricity (IRT 1994c).

CASE STUDIES: COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL SECTORS

PacifiCorp's Energy FinAnswer

PacifiCorp was one of the first utilities to introduce a financing component into energy efficiency programs for the commercial/industrial sector. The utility began its Energy FinAnswer program in 1990. The program has been especially successful with large commercial customers.

The FinAnswer Commercial New Construction Program includes extensive technical assistance identifying, installing, and commissioning energy-saving measures. Financing is available at competitive rates based on T-bill indices plus one and a half to three points. Loan terms are tied to credit risk and range from five to twelve years. Loans are packaged and sold to a major bank. Loans are repaid through an energy service charge (ESC) on the customer's bill. Some developers pass the costs of efficiency through to tenants, who pay for them on their utility bills. As discussed previously, this type of financing is attractive to developers because the ESC is not debt, so it doesn't increase the project financing.

The program has loaned more than $40 million, and measures installed since inception save 126 GWh in energy annually. The new construction program has achieved an estimated penetration rate of more than 50 percent in Oregon and 36 percent in Utah when evaluated on a square foot

of new construction basis (Jones 1996). The program's success is probably attributable to the extensive and high-quality services provided (Flanigan et al. 1995), and to Oregon's 35 percent tax credit for energy conservation investments (Holt, Gordon, and Tumidaj 1995).

This program allows PacifiCorp to minimize lost opportunities in new construction. Lending criteria are established by the bank and loans are administered in-house (Jones 1996). The utility places no liens on property and requires the customer to sign a memorandum of understanding regarding payment of ESCs. The utility's rationale for this approach is that in the case of default, it has a strong avenue of recourse: terminating power (Flanigan et al. 1995). Levelized utility costs are estimated at $0.018-0.020 per lifetime kWh saved (discount rate and measure life not provided) (Gordon et al. 1996).

PacifiCorp initiated Industrial Energy FinAnswer in 1992 as a branch of their Energy FinAnswer Program. The program was designed as an experimental energy conservation service for its industrial customers. PacifiCorp works closely with customers to make companies more "business smart." They conduct comprehensive energy audits, provide engineering services, and can arrange financing through the same service as the commercial program. As with the commercial FinAnswer, the loan is paid back through an energy services charge on the customer's electricity bill (Meadows 1995). PacifiCorp's industrial energy experts work with program participants to identify areas where they can achieve the most cost-effective results. In addition, the program offers commissioning, monitoring, and verification services on a shared-cost basis to ensure that energy savings are realized and maintained over time (Jones 1996).

PacifiCorp originally chose to target their largest industrial customers (demand greater than 500 kW per month) in order to keep the number of participants at a manageable level, so they would receive adequate service. The program was also offered to new industrial construction. More recently, the program was extended to all industrial customers in the states in which the program operates, although marketing still targets the largest customers (Backen 1995).

Overall, through 1996, the industrial component of the program has installed measures for 47 projects that save almost 230 GWh of energy annually. The program loaned $4.7 million to

industrial customers between 1992 and 1996; however, the majority of industrial customers prefer to use their own source of financing while taking advantage of the utility's energy efficiency services (Jones 1996). The levelized cost is reported to be less than $0.01 per kWh saved for the utility, and $0.018 per kWh saved when customer contributions are taken into account. The discount rate and measure life used for calculating these values were not provided. Reports from participating industrial customers indicate enhancements in productivity and product quality as well as energy savings (Backen 1995).

PacifiCorp is now marketing Energy FinAnswer to other utilities as well as PacifiCorp customers with additional locations outside the utility's territory (Jones 1996).

Connecticut Light & Power's Hospital Revolving Loan Fund

The Hospital Revolving Loan Fund was initiated in 1988 by Connecticut Light & Power (CL&P) in alliance with the Connecticut Hospital Association (CHA). The utility was motivated to take this action because of the hospitals' ability to leave the system or lessen their need to buy CL&P's power by installing cogeneration systems. The utility offers zero-interest loans and technical assistance to improve the energy efficiency of the 28 acute-care hospitals in its territory. The revolving loan fund was created with grants from CL&P's parent company, Northeast Utilities (NU), and is administered by Connecticut Health Institutional Services (CHIS), an affiliate of CHA (Flanigan et al. 1995).

Hospitals submit applications to CHA along with a technical report that specifies measures to be installed and estimated savings. An independent engineer and an advisory committee (three people, one each from NU, CHA, and the State Energy Office) review the report and determine whether the project will be approved. This process is completed in seven to ten days. The fund can finance up to 100 percent of the project costs, but has averaged 62 percent of costs (Flanigan et al. 1995). The average payback period is approximately five years (Morante 1996).

Since 1989, when the first loan was made, the Revolving Loan Fund has assisted 18 (two-thirds of eligible) hospitals. Approximately $5 million in loans have been issued for $8 million worth

of projects. Engineering estimates show annual energy savings of 22 GWh and demand savings of 45 MW (Morante 1996).

CHIS's involvement in the program has contributed toward its success in terms of keeping administrative costs low, simplifying the process for the customers and the utility, and marketing the program. CHIS has been able to process loans quickly and efficiently, which enhances the hospitals' cash flow positions. CHIS also markets the program through its monthly and weekly papers. CHIS involvement has allowed NU's administrative involvement to be minimized to less than one full-time manager. The success of this program has led NU to consider providing similar programs for other specific and general customer sectors (Flanigan et al. 1995).

Southern California Edison's ENvest program

In October 1993, Southern California Edison (SCE) created a regulated subsidiary, ENvest, as a two-year pilot to determine if providing energy efficiency services could survive as a self-sustaining, profitable venture outside of the regulated core utility business. The venture is financed with $77 million in shareholder money and $23 million in ratepayer funds, thereby reducing ratepayer impact. ENvest facilitates, manages, and finances customized value-added services to large customers through outside contractors. ENvest offers "turn-key" services to customers, including installation of cost-effective equipment, financing, support services, and warranties. This program attempts to appeal to customers by having a single point of contact, integrating services to meet customer needs, providing lower-cost solutions, and offering accountability to ensure that benefits are realized (Hassan 1995; King 1995). The majority of measures are either lighting or HVAC (Edgar et al. 1996).

The program finances 100 percent of the project in one of two ways: (1) SCE owns the energy efficiency upgrades and charges the customer a service charge; or (2) SCE lends the customer the necessary money, as with a conventional loan. Under both options, repayment is made through the customer's monthly electric bill (SCE 1994).

ENvest stopped qualifying participants at the end of 1995. During the two-year pilot, ENvest contacted approximately 151 potential participants (84 in the public sector, 45 commercial, and 22 industrial). As of December 31, 1995, ENvest had entered into 34 agreements with 26 different customers, all of which were government or institutional customers. As of March 31, 1996, none of the participants had defaulted and ENvest estimates that it will earn a 10.4 percent average return on its financing investment for the pilot (Edgar et al. 1996).

Part of the reason for the lack of interest by commercial and industrial customers is that although some customers are interested in the project management aspects of the program, they prefer to finance the measures themselves. As seen with other utility C&I programs with financing components, large customers tend to have better access to competitive financing rates, making them less interested in going through a utility program to finance energy efficiency. ENvest's underwriting requirements were fairly restrictive in an attempt to minimize risk (credit losses) to ratepayers. In addition, regulatory guidelines restricted the flexibility of the program in terms of measures it was allowed to offer, preventing customers from customizing the program to fit their specific needs (Edgar et al. 1996).

ENvest is estimated to annually save 150 GWh, reduce demand by over 37 MW, and save customers $15 million in utility bills. The projects have TRC energy-related benefit/cost ratios ranging from 1.1 to 1.8, and paybacks ranging from 4.2 to 11.4 years, with an average payback of 6.7 years. The fact that some of these payback periods are quite long suggests that customers probably recognized significant non-energy benefits that were not taken into account when calculating these payback periods. From the utility perspective, the program was also cost effective. As of Spring 1996, SCE (ratepayers) had spent $6.4 million in administrative costs and $1.1 million in co-investments (Edgar et al. 1996). Using an estimated 15-year measure life and 5 percent discount rate, ACEEE calculates the utility's levelized cost of saved energy to be approximately $0.005 per kWh saved.

In October 1995, SCE expressed an interest in spinning off the ENvest pilot and creating an unregulated subsidiary, but the California Public Utilities Commission denied the request, stating that SCE had an obligation to provide energy efficiency services to "captive ratepayers" who

helped fund the program. SCE hoped that if the program had more flexibility and less regulation, it would be more attractive to commercial and industrial customers because they could make the financing portion of the program optional (DSR 1995a; DSR 1995b). In 1996, the ENvest pilot ended as scheduled. SCE is now offering similar services through its unregulated subsidiary, Energy Source, using strictly stockholder and not ratepayer funds (Nadel 1996a).

In February 1995, Southern California Gas (SCG) introduced a program very similar to ENvest called TEEM (Total Energy Efficiency Management). Both pilots are fuel-neutral. The main difference between the two programs is that TEEM used only shareholder funds, not ratepayer funds, and was therefore not as restricted by the California Public Utility Commission's regulatory guidelines. TEEM has therefore been able to emphasize flexibility in meeting customers' specific needs—in terms of both measures and financing. Unfortunately, it is difficult to compare TEEM with ENvest because TEEM started several months later and had a limited staff during its first year. As a result, TEEM did not have much activity initially, with only three signed contracts as of April 1996 (one school district, one municipal government, and one industrial customer) (Edgar et al. 1996).

TEEM continued to solicit participants through the end of 1996, and, according to the utility, TEEM has been very successful. Data to corroborate the program's success are not available because they are proprietary. SCG's parent company (Pacific Enterprises) plans to continue to offer TEEM services—whether through SCG or through an unregulated affiliate (Knobbe 1996).

Public Service Electric and Gas' Standard Offer Program

Public Service Electric and Gas (PSE&G), the largest investor-owned utility in New Jersey, had a similar idea to SCE's, and created a semi-regulated subsidiary in 1993 to operate its Standard Offer Program both in New Jersey and outside of the state. The Standard Offer is a performance-based program that pays for measured energy savings. The program offers long-term contracts with standard terms to project sponsors (either customers, PSE&G's ESB, or ESCos) to fill a resource block. The design includes posted, time-differentiated prices that are paid for energy savings verified over the 5 to 15-year contract term. This approach lends itself well to a DSM

transition strategy because it could be managed by a statewide agency or consortium authorized to procure demand-side resources in pursuit of societal goals (Goldman, Kito, and Moezzi 1995).

PSE&G created a subsidiary, Public Service Conservation Resources Corporation (PSCRC), to provide investment capital and sponsorship to Standard Offer participants. If participants are large enough (i.e., can provide a 50 kW minimum average reduction in summer peak), they can work directly with PSE&G. If customers can offer a smaller demand-reduction block, they have the option of using PSCRC or a third-party ESCo to sponsor them in the Standard Offer. PSCRC and ESCos aggregate several smaller customers to reach the minimum block requirement. They also handle all aspects of the proposal, including evaluation of potential savings, engineering design, equipment installation, maintenance, and financing. In return for these services, the customer pays either a portion of its energy bill savings or a fixed payment (PSE&G 1996).

In May 1994, PSCRC created its Bright Investment program to promote lighting efficiency among small commercial and industrial customers (those with projects saving less than 50 kW). This program includes an audit, followed by recommendations for lighting upgrades. PSCRC pays up to 60 percent of the cost and offers financing for the balance at competitive interest rates. Repayment occurs over a two-year term and customers have the option of charging it on their credit cards. Over this two-year repayment period, customers receive 25 percent of the savings and after two years, customers receive all of the savings. PSCRC aggregates these savings from small projects and sells them to PSE&G through the Standard Offer (IRT 1994a).

As of the end of 1994, more than 1,000 facilities had committed to providing a total of approximately 40 MW of summer peak reduction. ACEEE estimates the average levelized utility cost at $0.056 per kWh saved (assuming a five percent real discount rate), which is about two-thirds of PSE&G's avoided cost as of that time (Goldman, Kito, and Moezzi 1995).

PG&E's Capital Advantage Financing Pilot

PG&E began its Capital Advantage DSM pilot at the end of 1994. The program offers third-party financing (through Wells Fargo Bank) to small to medium-sized commercial, industrial, and

institutional gas and electric customers who need assistance financing their projects in the utility's Retrofit Express, Retrofit Efficiency Options (REO), and Advanced Performance Options programs. Capital Advantage offers up to 100 percent financing at below-market interest rates to qualifying customers. PG&E's initial guideline was to "buy down" the interest rate up to a maximum of 75 percent of what it would have spent on a rebate for the project. In 1996, PG&E increased the maximum to 100 percent of the alternative rebate to make it as attractive as the rebate option. Repayments are structured to give the customer a positive net cash flow and no down payment is required. Capital Advantage is marketed by utility representatives and trade allies, and is most attractive to customers who have limited cash flow or capital (PG&E 1996).

Between its inception in the fourth quarter of 1994 and April 1996, 27 loan applications and ten energy efficiency projects were completed. Part of the reason why participation is rather low is that customers have rebate options through other programs. PG&E's goal for 1996 is to complete 75 out of 150 loan applications. PG&E spent $38,000 in 1995 on program administration, marketing, and promotion, and the utility has $550,000 in its incentive budget for 1996. Savings data are not available (PG&E 1996). The intent of the utility is to use this pilot to train its staff about financing as the industry moves away from rebates. Thus, unlike many other utilities, PG&E does not look to make a profit on this program, rather, PG&E sees the program as a low-cost way to provide customer service (Flanigan et al. 1995).

Virginia Power's Evantage Business and Financial Services

Virginia Power created Evantage as a non-regulated subsidiary that could provide customized, flexible approaches to financing energy efficiency services to commercial, industrial, and institutional customers. Evantage offers such options as seasonal payments and off-balance-sheet instruments, capital leases, and operating leases. Financial staff are trained in the applications and benefits of commercial, industrial, and institutional technologies. Evantage uses third-party financing sources and allows repayment on the customer's utility bill. To date, a handful of customers have taken advantage of Evantage services (Wolf 1996).

For example, Evantage has struck an agreement with Chesapeake Paper Products to design and build a $42 million, 38 MW combined-cycle, turbine cogeneration facility at Chesapeake's West Point Virginia facility. Evantage will finance the facility, which will serve current and future electricity and steam needs at the kraft pulp, paper, and liner board mill, and replace several oil-fired steam boilers at the mill. In addition, the comprehensive agreement calls for Evantage to: become Chesapeake's supplier of choice for the next 25 years for all types of energy including electricity, gas, coal, and fuel oil; provide training for the generating unit's operators and other Chesapeake personnel; and provide management services for rebuilding an existing boiler. Evantage's involvement will assist Chesapeake in expanding the plant with the planned addition of another paper machine (PR Newswire 1995; Southerland 1995).

Virginia Power intends to pursue similar projects with other companies under the Evantage operating unit. Virginia Power President and Chief Executive Officer James Rhodes said of the new venture that utilities "must become full-service energy companies, able to help their customers save money and use energy more efficiently in a complicated and changing market." In addition to those services included in the Chesapeake agreement, Evantage plans to offer energy efficiency planning and implementation, energy systems maintenance, and energy information services (Wamsted 1995). Due to the proprietary nature of Evantage's projects, cost and savings data are not available.

Many other utilities are setting up similar subsidiaries. As with Evantage, it is too soon to say how successful these subsidiaries will be.

Wisconsin Electric Power's End-Use Pricing Program

As discussed earlier, an old concept that is being considered again is Thomas Edison's idea that utilities should sell energy services, not kWh. Wisconsin Electric Power's (WEPCO) End-Use Pricing program, which began in 1993, provided equipment specification, purchase, ownership, maintenance, repair, and warranty, and the customer paid a monthly fee for end-use services. By the spring of 1994, the program had three participants and four more were close to being finalized. The participants included two supermarkets receiving refrigeration services and a school

district receiving air conditioning services. In marketing the program, the utility found that end-use services were attractive to some customers and not to others.

The program was abruptly canceled, however, after local contractors complained that the utility was taking business away from them. WEPCO canceled the program rather than risk a large fight with local contractors; avoiding a fight was important because the utility was seeking regulatory approval for a merger with neighboring Northern States Power. Program managers at WEPCO think the program design and concept are sound and that end-use services are an attractive market. However, greater attention needs to be paid to trade ally relations, including bringing local trade allies into the program even though equipment prices may be a little higher working with local distributors and contractors. Another option is to operate such programs through unregulated subsidiaries or through private companies not affiliated with the utility. In these cases, contractor complaints to the utility commission would be less of a concern (IRT 1996a). Costs and savings data are not available.

ANALYSIS OF EXISTING PROGRAMS

Table 1 summarizes the data available for programs reviewed. The case studies profiled in this report were chosen for the lessons that can be learned from them. They represent a variety of types of financing mechanisms, target a variety of customer sectors, and have a variety of funding sources. The programs have achieved various levels of success, but all teach lessons, which is particularly important in this transitional period, during which the status quo no longer works and everyone is looking for new paths to success.

What works is specific to the utility and the customer. A utility's individual financial resources and expertise will affect its decision regarding obtaining funding and servicing loans either in-house or using a third-party. Similarly, customers have varying levels of financial resources and expertise, which affects whether or not they are interested in securing financing through a utility program and what type of financing best suits their needs. Most of these programs are tailored to some type of niche market, either they are offered for a single community (Burlington or New

Table 1. Financing Utility Energy Efficiency

Utility	Program	Start Date	Primary Sectors Participating	Source of Funds	Financing Type	# of Partici-pants	Partici-pation Rate	Annual Energy Savings	Utility CSE ($/kWh)*
PG&E	Home Energy Savings Loan	1994	residential	third party	loan	>8,000	20% of a/c sales	2,900 MWh 24,400 therms	0.035
VA Power	Financing for Energy Effic.	1993	residential	ratepayer	loan	>6,000	-	N/A	N/A
SMUD	Conservation Power Financing	1977	C/I residential	ratepayer	loan	>27,500	15%	N/A	N/A
WPP/WG	New London	1993	C/I residential	ratepayer	ESC	158 C/I 555 HH	53% C/I 27% res	3.5 GWh 440M therms	0.007-0.015
Burlington	Smartlight	1989	residential	ratepayer	lease	6,100	>45%	4.8 GWh	0.03
PacifiCorp	FinAnswer	1990	commercial	ratepayer	ESC	-	> 50%	64 GWh	0.018-0.020 **
CL&P	Hospital Revolving Loan	1988	hospitals	ratepayer	revolving loan	18	64%	45 MW 22 GWh	-
SCE	ENvest	1993	institutional	shareholder & ratepayer	ESC	26	-	37 MW 150 GWh	0.005
PSE&G	Standard Offer	1993	C/I	ESB or third party	shared savings	1,041	-	40 MW	0.056
PG&E	Capital Advantage	1994	C/I	third party	loan	27	-	N/A	N/A
VA Power	Evantage	1995	C/I	third party	ESC	< 10	-	proprietary	N/A
WEPCo	End-Use Pricing	1993	C/I	ratepayer	end-use pricing	<10	-	N/A	N/A

* Using a 5% real discount rate

** Discount rate not specified

London), a single type of customer (hospitals or public buildings), or a particular market type (commercial new construction). Additional experimentation is needed to see whether loans and leases can be effective in promoting energy efficiency in other customer segments.

Successful financing mechanisms involve aggressive marketing (generally by organizations trusted in the community) and technical assistance, and therefore may have significant utility marketing and administrative costs (Flanigan et al. 1995; Nadel, Pye, and Jordan 1994). Some programs that have financing components, such as Wisconsin's New London Project and ENvest, have managed to keep levelized utility costs at or below $0.01 per kWh saved. Because this new generation of programs with financing mechanisms is still on a learning curve, and because many customers may be less interested in loans than rebates, participation levels have not yet achieved the levels experienced by successful rebate programs in the past, which ranged from 15 percent to nearly 100 percent (Nadel, Pye, and Jordan 1994).

Some utilities have found that trying to fund and service loans in-house have created a financial risk that they are not able to bear. SMUD, for example, has been experiencing a high default rate on its residential loans, indicating a need for more stringent underwriting criteria. Other utilities have found that servicing of loans can be done more efficiently by a third party. Energy service charges have proven to have certain advantages, making repayment of loans simpler for the customer and the utility, and minimizing the default rate since the utility has the recourse of threatening to turn off power if the customer fails to make payments. Customers, in general, benefit from a positive cash flow, and utilities benefit from strengthening their relationships with customers.

Although the residential market has often been considered a difficult one to market to, new approaches and instruments, such as Fannie Mae's low-interest funding for residential energy efficiency upgrades (used in PG&E's Home Energy Savings Loan), have heightened the residential sector's interest in financing energy efficiency. Two programs (Wisconsin's New London Resource Project and Burlington's Smartlight) have been successful with the community-based approach, using a community's cohesive network to promote their programs.

The restrictions that have been attached to using ratepayer funds have become more obvious now that deregulation is becoming a reality. SCE's ENvest, in particular, has been constrained by regulatory requirements imposed on both energy efficiency measures and financing. This circumstance has contributed to the burgeoning trend towards utilities forming semi-regulated or non-regulated energy services businesses, such as Virginia Power's Evantage and PSE&G's PSCRC. Although it is still too early for a quantitative comparison between non-regulated ESBs and ratepayer-funded programs, non-regulated ESBs will have the advantage of being associated with the utility but will not be limited regarding the type of services or financing they can offer. Programs with ratepayer funding will generally have a lower cost of capital (Nadel 1996b).

RECOMMENDATIONS

From the observations made from the case studies profiled in this report, we offer several general recommendations to utilities interested in offering customers financing options for energy efficiency services:

- Design programs that are flexible, in terms of both energy efficiency measures and financial services, or can be tailored to accommodate specific customer needs.

- Streamline the loan approval process to be quick and responsive to customers' needs, while providing adequate protection to the utility.

- If the utility does not have in-house financing expertise, work with a primary lender that understands both finance and energy efficiency.

- Build a default pool into the cost of loans to all customers since customers with greater energy efficiency needs may be less able to repay them.

- Structure repayment schedules to allow the customer a positive cash flow after subtracting payments from energy bill savings. (This may not be cost effective for the utility if the

repayment periods have to be made inordinately long and payments inordinately small to achieve positive cash flow.)

- Consider including loan repayments on the utility bill to simplify the payment process for the customer and reduce defaults. This approach also allows developers to pass-through costs to tenants. (The feasibility of this approach will be dependent upon the utility's accounts receivable system.)

- Market program benefits such as comfort (for residential customers), ease of participation, contractor arranging, dollar savings, and positive-cash-flow financing, since rebates are no longer an incentive. Understand which benefits appeal to which customers.

- Strengthen synergistic relationships with third-party partners. Vendors and contractors can solicit customers and coordinate paperwork, promoting and facilitating the process. Provide financial and marketing training to those promoting the program.

- Certify contractors to assure quality installations since the utility usually bears liability related to program contractors.

- Use vendor relationships to avoid lost opportunities. Customers in need of replacing equipment will most likely contact the equipment vendor first. Since equipment replacement is often unexpected, a customer may be more likely to need some financial assistance.

- Bundle efficiency services (e.g., electricity, gas, and water) to maximize customer benefits and minimize program costs per service provided. Sell the customer solutions, not a specific technology or financial product.

- Recognize that financing tools will not serve all market niches, so financing should be complemented with other energy efficiency program strategies.

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